

# PATENT ABSTRACTS OF JAPAN

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## (54) BUBBLE-CONTAINING O/W EMULSIFIED CONDIMENT

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a bubble-containing O/W emulsified condiment having a light food feeling immediately after being produced and enabling food taste to be maintained for a long term.

**SOLUTION:** This nitrogen bubble-containing O/W emulsified condiment having 100,000–1,000,000 Pa.s overall viscosity, the pH value of 3.0–5.0 and the specific gravity of 80–98% times the one of the degassed O/W emulsified condiment is prepared by including (A) egg yolk lipoprotein and (B) protein other than egg yolk lipoprotein, causing acid denaturation in the region of pH 3.0–5.0.

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] the oil-in-water type emulsification seasoning with which protein other than yolk lipoprotein and said yolk lipoprotein which causes acid denaturation in the range of pH 3.0-5.0 was blended, 100,000 - 1 million mPa-s was carried out for the whole viscosity, and degassing of 3.0-5.0, and the specific gravity was carried out for pH -- receiving -- 80 - 98% -- it is -- nitrogen -- foam-containing \*\*\*\*\* -- the cellular entering oil-in-water type emulsification seasoning characterized by things.

[Claim 2] The cellular entering oil-in-water type emulsification seasoning according to claim 1 with which protein other than said yolk lipoprotein with which yolk lipoprotein causes acid denaturation in the range of pH 3.0-5.0 1.5 to 7.5% of the weight to a product was blended 0.2 to 0.8% of the weight.

[Claim 3] The cellular entering oil-in-water type emulsification seasoning according to claim 1 to 2 whose some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein.

[Claim 4] The cellular entering oil-in-water type emulsification seasoning according to claim 3 whose content of the yolk RIZOHOSUHORIPO protein in yolk lipoprotein is 10 % of the weight or more to whole egg yellow lipoprotein.

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to light mouthfeel immediately after manufacture, and the cellular entering oil-in-water type emulsification seasoning with which the flavor was maintained for a long period of time further.

[0002] Mayonnaise, salad dressing, etc. are known as a model unit of an oil-in-water type emulsification seasoning. However, it became the inclination for what has mouthfeel lighter than such a conventional product with diversification of taste to be demanded in recent years.

[0003] The oil-in-water type emulsification seasoning in which put in air bubbles and there was light mouthfeel rather than the conventional product is proposed by JP,3-228663,A that it should correspond to change of such a taste. However, probably because it was difficult for the cellular entering oil-in-water type emulsification seasoning proposed here to maintain air bubbles at stability if it is left after that and for a long period of time, although it has light mouthfeel immediately after manufacture since air bubbles are contained to be sure, it had the problem that light mouthfeel immediately after manufacture was unmaintainable.

[0004] Then, the purpose of this invention is offering light mouthfeel immediately after manufacture, and the cellular entering oil-in-water type emulsification seasoning with which the flavor's was maintained for a long period of time further.

[0005]

[Means for Solving the Problem] this invention persons came to complete this invention, as a result of repeating research wholeheartedly that the above-mentioned purpose should be attained. Namely, protein other than said yolk lipoprotein with which this invention causes acid denaturation in (1) yolk lipoprotein and the range of pH 3.0-5.0 is blended. It is 80 - 98% to the oil-in-water type emulsification seasoning with which 100,000 - 1 million mPa-s was carried out for the whole viscosity, and degassing of 3.0-5.0, and the specific gravity was carried out for pH. The oil-in-water type emulsification seasoning containing foam-containing \*\*\*\*\* air bubbles and (2) products are received in nitrogen. Yolk lipoprotein 1.5 - 7.5 % of the weight, The cellular entering oil-in-water type emulsification seasoning of (1) with which protein other than said yolk lipoprotein which causes acid denaturation in the range of pH 3.0-5.0 was blended 0.2 to 0.8% of the weight, (3) (1) thru/or (2) cellular entering oil-in-water type emulsification seasonings whose some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein, (4) The content of the yolk RIZOHOSUHORIPO protein in yolk lipoprotein is offering the cellular entering oil-in-water type emulsification seasoning of (3) which is 10 % of the weight or more to whole egg yellow lipoprotein.

[0006] In this invention, the seasoning with which, as for the oil-in-water type emulsification seasoning, the emulsification condition was maintained by edible oil and fat distributing to homogeneity in the aqueous phase is said, and mayonnaise, salad dressing, etc. are mentioned as a model unit. Generally such an oil-in-water type seasoning contains edible oil and fat 20 to 90% of the weight, and its same is said of the edible-oil-and-fat content of this invention article. Moreover, especially if the edible oil and fat used for this invention is edible oil and fat generally used as an oil-in-water type seasoning, it is not limited, and the fats and oils obtained by performing chemical preparation like animal and vegetable oils and these salad oil, such as corn oil, cotton seed oil, safflower oil, olive oil, safflower oil, soybean oil, palm oil, palm oil, and fish oil, or MCT (medium-chain-fatty-acid ester) are mentioned.

[0007] Moreover, although this invention is the cellular entering oil-in-water type emulsification seasoning with which air bubbles existed in homogeneity mostly at the whole, the magnitude of the common food whipped as magnitude of air bubbles and its air bubbles is comparable, and the magnitude is usually about thousands of microns from several microns. Moreover, in this invention, the gas in air bubbles uses nitrogen. If it uses as shown in the below-mentioned

example of a trial, the gas, for example, the carbon dioxide gas, other than nitrogen, or if air is only used, in a flavor, it is satisfactory immediately after manufacture, but after that, if it is left for a long period of time, the flavor immediately after manufacture is not maintained and it is not desirable. In addition, although the thing of about 100 capacity % has desirable purity as nitrogen, it is satisfactory if it is the purity more than about 90 capacity %.

[0008] Although yolk lipoprotein is complex which exists as a principal component of the yolk which consists of components, such as phospholipid, cholesterol, a triglyceride, and yolk protein, in this invention The yolk RIZOHOSUHORIPO protein which processed yolk lipoprotein further by the phospholipase A which is a phospholipid dialytic ferment, decomposed the ester bond of either [ of phospholipid ] the 1st place or the 2nd place in this invention, and formed complex in the state of lysophospholipid and a fatty acid, What processed yolk lipoprotein with the proteolytic enzyme, pressurization, or the thing which carried out heat denaturation is contained. In addition, as yolk lipoprotein used by this invention, the yolk liquid usually used as a raw material of emulsification food may be used for this invention article as it is, and what used as the dried food the liquid obtained by performing the above processings or these liquid with spray drying (spray dry), freeze drying (freeze-dry), etc., the thing which carried out water return of this dried food further may be used.

[0009] As yolk lipoprotein used by this invention, it is desirable that some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein, and it is more desirable that the yolk RIZOHOSUHORIPO protein in yolk lipoprotein is 10 % of the weight or more to whole egg yellow lipoprotein further. The reason is that lighter mouthfeel immediately after manufacture is maintainable, even if light mouthfeel immediately after manufacture is maintained more, it is desirable, lighter mouthfeel is obtained immediately after the way where the rate of yolk RIZOHOSUHORIPO protein used 10% of the weight or more of yolk lipoprotein further manufactures even if the way which used that whose some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein leaves it for a long period of time, as shown in the below-mentioned example of a trial, and it leaves it for a long period of time.

[0010] moreover, in order to obtain that whose some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein, the method of terminating the reaction in the place for which phospholipase A is made to act on yolk liquid, and it asks or the yolk liquid which used whole egg yellow lipoprotein as yolk RIZOHOSUHORIPO protein by phospholipase A, and unsettled yolk liquid are mixed at a rate of arbitration -- it is -- it is -- there is the approach of blending with a product separately etc.

[0011] Like for example, albumen protein, casein and its salt, soybean protein, and wheat protein, protein other than the yolk lipoprotein which causes acid denaturation in the range of pH 3.0-5.0 in this invention means a lifting and a cone thing, tends to carry out the air bubbles of the acid denaturation, and its albumen protein with a stable bubble is desirable. Since it has light mouthfeel immediately after manufacture only with the milk serum protein said to the lifting as the pile in acid denaturation by pH 3.0-5.0, and light mouthfeel immediately after manufacture is unmaintainable by leaving it after that and for a long period of time although it is satisfactory as shown in the below-mentioned example of a trial, it is not desirable.

[0012] As this invention shows above-mentioned yolk lipoprotein and protein other than the yolk lipoprotein which causes acid denaturation in the range of pH 3.0-5.0 to a product to the example of a trial of the after-mentioned [ 1.5 - 7.5 % of the weight, and making it blend 0.2 to 0.8% of the weight ], respectively, even if it leaves it for a long period of time, it is desirable from light mouthfeel immediately after manufacture being more maintainable.

[0013] The whole viscosity of the cellular entering oil-in-water type emulsification seasoning of this invention is 100,000 or more mPa·s. If viscosity is lower than this, as shown in the below-mentioned example of a trial, light mouthfeel immediately after manufacture cannot be maintained for a long period of time, and it is not desirable. In addition, it is because its viscosity is too high and is not desirable as an oil-in-water type emulsification seasoning, although light mouthfeel immediately after manufacture is maintainable even if it is larger than it to have made the whole viscosity into 1 million or less mPa·s. Moreover, the viscosity of this invention is HELIPATH after being filled up with the cellular entering oil-in-water type emulsification seasoning of this invention about 200ml to the beaker of 200ml capacity. It is T-BAR at a Brookfield viscometer with STAND [Tokyo Keiki Make]. SPINDLE It is the viscosity of 1 minute after using the rotor of D in about 20 degrees C of temperature of goods, and rotational frequency 2rpm.

[0014] pH of this invention article is 5.0 or less. If pH is higher than this, as shown in the below-mentioned example of a trial, light mouthfeel immediately after manufacture cannot be maintained for a long period of time, and it is not desirable. In addition, it is because its flavor is too sour and is not desirable as an oil-in-water type emulsification seasoning, although the target thing may be made even if it is smaller than it to have made pH or more into 3.0. Although it does not limit especially as an approach of making pH 5.0 or less by this invention, it is good to, use acid material, such as vinegar which made the principal component organic acids, such as an acetic acid, a lactic acid, a malic acid, a citric acid, a maleic acid, a fumaric acid, a succinic acid, and an adipic acid, or these, a fermentation lactic

acid, apple vinegar, and lemonade, for example.

[0015] Moreover, this invention article is 85 - 96% preferably 80 to 98% to the oil-in-water type emulsification seasoning with which degassing of the specific gravity was carried out. If fewer than 98% as shown in the below-mentioned example of a trial, since mouthfeel immediately after manufacture is not light as foam-containing \*\*\*\*\*, it is not desirable, and since light mouthfeel immediately after manufacture is unmaintainable for a long period of time if [ than 80% ] more, it is not desirable. In addition, the rate of specific gravity to the degassing article in this invention is a rate computed using the measuring cylinder for 3L (liter) measurement with the specific gravity at the time of about 20 degrees C of temperature of goods.

[0016] In addition to an above-mentioned food raw material, in the range which does not spoil the effectiveness of this invention, various food raw materials can be suitably chosen as the cellular entering oil-in-water type emulsification seasoning of this invention, and can be blended with it. for example, thickeners, such as various seasonings, such as sodium glutamate, sugar, salt, bean paste, soy sauce, many tastes, and red, spinach Chinese miso, the extractives of animals and plants, xanthan gum, locust bean gum, gellant gum, tamarind seed gum, raw starch, and modified starch, and mustard -- a spice, various implement material, paste-like objects, etc., such as powder, are mentioned.

[0017] the oil-in-water type emulsification seasoning with which protein other than yolk lipoprotein and said yolk lipoprotein which causes acid denaturation in the range of pH 3.0-5.0 combined the cellular entering oil-in-water type emulsification seasoning of this invention, 100,000 - 1 million mPa-s was carried out for the whole viscosity, and degassing of 3.0-5.0, and the specific gravity was carried out for pH -- receiving -- 80 - 98% -- carrying out -- nitrogen -- foam-containing \*\*\*\*\* -- it will not become light mouthfeel immediately after manufacture, and the desirable emulsification seasoning with which the flavor was maintained for a long period of time without things further.

[0018] Next, this invention is further explained to a detail based on an example and the example of a trial. In addition, this invention is not limited to these.

[0019]

[Example] 10kg of yolk liquid and 7.0kg of Shimizu whose about 30% of the weight of [example 1] yolk lipoprotein is yolk RIZOHOSUHORIPO protein, 4.5kg of fresh egg whites, 4.5kg (13 % of the weight of acidity) of vinegar, 1.8kg of salt, and 1.7kg of very-refined sugar -- and -- since -- having carried out and throwing in 0.5kg of powder in a mixer one by one, it stirred, while carrying out \*\* ON of the nitrogen (more than purity 99 capacity %) into the solution, and it considered as homogeneity with foam-containing \*\*\*\*\*. Then, the \*\* ON of nitrogen added 70kg of salad oil gradually, continuing, and was made to rough-emulsify it with foam-containing \*\*\*\*. Next, the rough emulsification object of this cellular entering was filled up with and sealed at the tube of 300ml capacity, after giving through finishing emulsification immediately to a colloid mill.

[0020] Compared with what was manufactured without carrying out \*\* ON of the nitrogen, it has light mouthfeel, and, as for the obtained cellular entering oil-in-water type emulsification seasoning, two months after room temperature preservation was maintaining the flavor to light mouthfeel immediately after manufacture, and the pan. In addition, the yolk lipoprotein in a product (30 % of the weight is yolk RIZOHOSUHORIPO protein among those) is 5 % of the weight, and albumen protein is 0.45 % of the weight. Moreover, the whole viscosity was about 250,000 mPa-s, pH was 4.0, and specific gravity was 92% to what was manufactured while deaerating.

[0021] [example 2] Shimizu -- modified starch (alpha-ized modified starch: -- Oji-National COMPANY and the product made from LTD. --) Trade name "instant clear gel" 28.7kg of water solutions in which 3.0kg, xanthan gum 0.2kg, and tamarind seed gum 0.1kg were dissolved, 10kg of yolk liquid whose about 30% of the weight of yolk lipoprotein is yolk RIZOHOSUHORIPO protein, While carrying out \*\* ON of the nitrogen (more than purity 99 capacity %) into a solution, throwing in 7.0kg of fresh egg whites, 6.1kg (13 % of the weight of acidity) of vinegar, 4.7kg of very-refined sugar, 3.0kg of salt, and 0.5kg of sodium glutamate in a mixer one by one It stirred and considered as homogeneity with foam-containing \*\*\*\*\*. Then, the \*\* ON of nitrogen added 40kg of salad oil gradually, continuing, and was made to rough-emulsify it with foam-containing \*\*\*\*. Next, the rough emulsification object of this cellular entering was filled up with and sealed at the tube of 300ml capacity, after giving through finishing emulsification immediately to a colloid mill.

[0022] Compared with what was manufactured without carrying out \*\* ON of the nitrogen, it has light mouthfeel, and, as for the obtained cellular entering oil-in-water type emulsification seasoning, two months after room temperature preservation was maintaining the flavor to light mouthfeel immediately after adjustment, and the pan. In addition, the yolk lipoprotein in a product (30 % of the weight is yolk RIZOHOSUHORIPO protein among those) is 5 % of the weight, and albumen protein is 0.7 % of the weight. Moreover, the whole viscosity was about 240,000 mPa-s, pH was 4.1, and specific gravity was 91% to what was manufactured while deaerating.

[0023]

[Test Example(s)] In order to investigate a change of the flavor by the class of [example 1 of trial] foam-containing \*\*\*\*\* gas with time, in the example 1, it changed to nitrogen, the thing (comparison article No.1) using carbon dioxide gas and the thing using air were manufactured (comparison article No.2), and this was compared with the thing (invention No.1) obtained in the example 1. In addition, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture.

[0024]

[Table 1]

	気体の種類	食味の変化
発明品No. 1	空素	殆ど変化なし
比較品No. 1	炭酸ガス	酸味が増している
比較品No. 2	空気	油脂がやや変敗している

[0025] From Table 1, if nitrogen is not used as a class of foam-containing \*\*\*\*\* gas, when it is left for a long period of time, it is understood that the flavor immediately after manufacture is unmaintainable. In addition, it has light mouthfeel and, as for the elegance immediately after manufacture which carried out \*\* ON of each gas as compared with what was manufactured while not carrying out \*\* ON of each gas but deaerating it, two months after room temperature preservation was maintaining light mouthfeel immediately after adjustment.

[0026] In order to investigate a change of mouthfeel of the case where the [example 2 of trial] yolk lipoprotein is used, and the case where that is not right with time, it exists in this yolk lipoprotein instead of the yolk lipoprotein used in the example 1 in the example 1 -- almost -- the yolk phospholipid [Q.P. Corp. make of tales doses -- Trade name "yolk lecithin PL-100H" Using] and yolk lysophospholipid [the Q.P. Corp. make and a trade name "yolk lecithin LC-100"], the insufficiency manufactured what \*\*\*\*(ed) Shimizu (comparison article No.3), and compared this with the thing (invention No.1) obtained in the example 1. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control.

[0027]

[Table 2]

	卵黄リボ蛋白質の配合の有無	食感の経時的变化
発明品No. 1	配合している	◎
比較品No. 3	配合していない	×

[0028] The notation of \*\* 1 front Naka

O Thing x which changed with a little light mouthfeel after preservation although light mouthfeel or a little light mouthfeel before the thing O:preservation which is maintaining light mouthfeel or a little light mouthfeel before saving after :preservation was changing a little [ after / preservation ] and it was light mouthfeel before the thing

\*\*:preservation which is satisfactory extent : it has mouthfeel comparable as a negative control before preservation or after preservation. [0029] From Table 2, if yolk lipoprotein is not blended, when it is left for a long period of time, it is understood that light mouthfeel immediately after manufacture is unmaintainable. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0030] In order to investigate a change of mouthfeel of the case where protein other than the yolk lipoprotein which causes acid denaturation in the range of the [examples of a trial] 3 pH is used, and the case where that is not right with time, [ 3.0-5.0 ] Using the milk serum protein of tales doses mostly with the albumen protein in this fresh egg white instead of the fresh egg white used in the example 1 in the example 1, the insufficiency manufactured what \*\*\*\*(ed) Shimizu (comparison article No.4), and compared this with the thing (invention No.1) obtained in the example 1. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0031]

[Table 3]

	酸変性蛋白質の配合の有無	食感の経時的变化
発明品No. 1	配合している	◎
比較品No. 4	配合していない	×

[0032] From Table 3, if acid derived protein is not blended, when it is left for a long period of time, it is understood that light mouthfeel immediately after manufacture is unmaintainable. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0033] What was made into the viscosity which changes the rotational frequency and path clearance of a colloid mill which were used in the example 1 at the time of manufacture, and is shown in Table 4 in order to investigate a change of mouthfeel by the viscosity of the [example 4 of trial] result with time (comparison article No.5, invention No.2-5), Moreover, the hyperviscous thing manufactured, respectively what was made into the viscosity which adds modified starch (trade name "instant clear gel") in a rough emulsification phase further, and is shown in Table 4 (invention No.6-7, comparison article No.6), and evaluated it. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0034]

Table 4

	仕上がり粘度 (mPa·s)	食感の経時 的変化
比較品No. 5	7万	×
発明品No. 2	10万	○
発明品No. 3	15万	◎
発明品No. 4	21万	○
発明品No. 5	48万	○
発明品No. 6	76万	○
発明品No. 7	100万	○
比較品No. 6	121万	○

[0035] From Table 4, if viscosity of a result is not made into 100,000 or more mPa-s, when it is left for a long period of time, it is understood that light mouthfeel immediately after manufacture is unmaintainable. In addition, although, as for the flavor immediately after manufacture, which preservation article was maintained, comparison article No.6 had too high viscosity, and it was not desirable as an oil-in-water type emulsification seasoning.

[0036] In order to investigate a change of mouthfeel by pH of the [example 5 of trial] result with time, what was set to pH which changes the addition of vinegar in an example 1 and is shown in Table 5 was manufactured, respectively, and was evaluated. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0037]

Table 5

	仕上がりpH	食感の経時 的変化
比較品No. 7	5.5	△
発明品No. 8	5.0	○
発明品No. 9	4.6	◎
発明品No. 10	3.8	○
発明品No. 11	3.0	○
比較品No. 8	2.7	○

[0038] From Table 5, if pH of a result is not made or less into 5.0, when it is left for a long period of time, it is understood that light mouthfeel immediately after manufacture is unmaintainable. In addition, although, as for the flavor immediately after manufacture, which preservation article was maintained, comparison article No.8 had the too sour flavor, and it was not desirable.

[0039] In order to investigate a change of mouthfeel by the difference in the [example 6 of trial] specific gravity with time, what changes the rotational frequency and mixing time of a mixer in a rough emulsification phase in an example 1, and is shown in Table 6 (specific gravity to what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it comparatively) was manufactured, respectively, and was evaluated. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the

newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0040]

[Table 6]

	脱気品に対する比重の割合	食感の経時的变化
比較品No. 9	9.9%	×
発明品No. 12	9.8%	○
発明品No. 13	9.6%	◎
発明品No. 14	9.2%	◎
発明品No. 15	8.5%	◎
発明品No. 16	8.0%	○
比較品No. 10	7.5%	△

[0041] From Table 6, if the rate of specific gravity to a degassing article does not consider as the range which is 80 - 98%, when it is left for a long period of time, it is understood that light mouthfeel immediately after manufacture is unmaintainable and that it is especially desirable as maintenance of light mouthfeel immediately after manufacture of 85 - 96%. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0042] In order to investigate a change of mouthfeel by the loadings of the [example 7 of trial] yolk lipoprotein with time, the thing of the loadings of the yolk lipoprotein which changes the loadings of yolk liquid in an example 1, and is shown in Table (a part for excess and deficiency is adjusted in Shimizu) 7 was manufactured, respectively, and was evaluated. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0043]

[Table 7]

	卵黄リボ蛋白質の配合量	食感の経時的变化
発明品No. 17	1.0%	○
発明品No. 18	1.5%	◎
発明品No. 19	4.0%	◎
発明品No. 20	6.0%	◎
発明品No. 21	7.5%	◎
発明品No. 22	8.0%	○

[0044] From Table 7, even if what made the loadings of yolk lipoprotein 1.5 - 7.5% of the weight of the range leaves it for a long period of time, he can maintain light mouthfeel immediately after manufacture more, and a desirable thing is understood. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0045] In order to investigate a change of mouthfeel by the loadings of protein other than the yolk lipoprotein which causes acid denaturation in the range of the [examples of a trial] 8 pH with time, the thing of the loadings of the albumen protein which changes the loadings of fresh egg white in an example 1, and is shown in Table (a part for excess and deficiency is adjusted in Shimizu) 8 was manufactured, respectively, and was evaluated. [ 3.0-5.0 ] In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control. The notation of front Naka is the same as the example 2 of a trial.

[0046]

[Table 8]

	卵白蛋白質の配合量	食感の経時的变化
発明品No. 23	0.15%	○
発明品No. 24	0.2%	◎
発明品No. 25	0.5%	◎
発明品No. 26	0.8%	◎
発明品No. 27	0.9%	○

[0047] From Table 8, even if what made the loadings of protein protein 0.2 - 0.8% of the weight of the range leaves it for a long period of time, he can maintain light mouthfeel immediately after manufacture more, and a desirable thing is understood. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0048] In order to investigate a change of mouthfeel by the rate of the yolk RIZOHOSUHORIPO protein in the [example 9 of trial] yolk lipoprotein with time, the thing using the yolk liquid of the rate of the yolk RIZOHOSUHORIPO protein which changes the processing conditions of phospholipase A in an example 1, and is shown in Table 9 was manufactured, respectively, and was evaluated. In addition, like the example 1 of a trial, the trial was saved for two months at the room temperature, and tried and evaluated both by using this and the newly manufactured thing as the elegance immediately after manufacture. Moreover, what was manufactured while not carrying out \*\* ON of the nitrogen but deaerating it was made into the negative control.

[0049]

[Table 9]

	リゾ 蛋白質中のリゾ ホス リゾ 蛋白質の割合	食感の経時 的変化
発明品No. 28	0 %	○-2
発明品No. 29	5 %	○-2
発明品No. 30	10 %	○-1
発明品No. 31	40 %	○-1
発明品No. 32	80 %	○-1
発明品No. 33	100 %	○-1

[0050] The notation of \*\* 2 front Naka

-1 : O Light mouthfeel before saving after preservation Thing O-2 currently maintained : a little light mouthfeel before saving after preservation Thing \*\* which is extent which is satisfactory although a little light mouthfeel before the thing O-2:preservation which is extent which is satisfactory although light mouthfeel before the thing O-1:preservation currently maintained is changing a little [ after / preservation ] is changing a little [ after / preservation ] : although it is light mouthfeel before preservation Thing x which changed with a little light mouthfeel after preservation: Set before preservation or after preservation. What has mouthfeel comparable as a negative control [0051] From Table 9, the way which used that whose some or all of yolk lipoprotein is yolk RIZOHOSUHORIPO protein leaves it for a long period of time. Even if it is desirable from light mouthfeel just behind \*\*\*\*\* being maintainable, lighter mouthfeel is obtained immediately after the way where the rate of yolk RIZOHOSUHORIPO protein used 10% of the weight or more of yolk lipoprotein further manufactures, and it leaves it for a long period of time, a more desirable thing is understood from the thing which maintain lighter mouthfeel immediately after manufacture and for which things can be carried out. In addition, as for the flavor immediately after manufacture, which preservation article was maintained.

[0052] As stated above, since a flavor is maintained by mouthfeel light [ immediately after manufacture ], and the pan for a long period of time, as for the cellular entering oil-in-water type emulsification seasoning of this invention, expansion of the further need of an oil-in-water type emulsification seasoning is expected.

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(54) 【発明の名称】 気泡入り水中油型乳化調味料

(57) 【要約】

【課題】 製造直後の軽い食感、さらには食味が長期間維持された気泡入り水中油型乳化調味料を提供する。

【解決手段】 卵黄リポ蛋白質、及びpH 3.0~5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が配合され、全体の粘度が10万~100万mPa·s、pHが3.0~5.0、比重が脱気された水中油型乳化調味料に対し80~98%であり、窒素を含泡させた気泡入り水中油型乳化調味料。

## 【特許請求の範囲】

【請求項1】 卵黄リポ蛋白質、及びpH3.0~5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が配合され、全体の粘度が10万~100万mPa·s、pHが3.0~5.0、比重が脱気された水中油型乳化調味料に対し80~98%であり、窒素を含泡させることを特徴とする気泡入り水中油型乳化調味料。

【請求項2】 製品に対し卵黄リポ蛋白質が1.5~7.5重量%、pH3.0~5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が0.2~0.8重量%配合された請求項1記載の気泡入り水中油型乳化調味料。

【請求項3】 卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質である請求項1乃至2記載の気泡入り水中油型乳化調味料。

【請求項4】 卵黄リポ蛋白質中における卵黄リゾホスホリポ蛋白質の含有量が全卵黄リポ蛋白質に対し10重量%以上である請求項3記載の気泡入り水中油型乳化調味料。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、製造直後の軽い食感、さらには食味が長期間維持された気泡入り水中油型乳化調味料に関する。

【0002】 水中油型乳化調味料の代表的製品としてマヨネーズやサラダドレッシング等が知られている。ところが、近年、嗜好の多様化に伴い従来のこのような製品よりも軽い食感を有するものが要望される傾向になった。

【0003】 このような嗜好の変化に対応すべく特開平3-228663号公報には、気泡を入れて従来の製品よりも軽い食感とした水中油型乳化調味料が提案されている。しかしながら、ここに提案されている気泡入り水中油型乳化調味料は、確かに気泡が入っているため製造直後は軽い食感を有するものの、その後、長期間放置すると気泡を安定に保つことが難しいためか、製造直後の軽い食感を維持することが出来ないという問題があった。

【0004】 そこで本発明の目的は、製造直後の軽い食感、さらには食味が長期間維持された気泡入り水中油型乳化調味料を提供することである。

## 【0005】

【課題を解決するための手段】 本発明者らは、上記の目的を達成すべく鋭意研究を重ねた結果、本発明を完成するに至った。すなわち、本発明は、(1) 卵黄リポ蛋白質、及びpH3.0~5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が配合され、全体の粘度が10万~100万mPa·s、pHが3.0~5.0、比重が脱気された水中油型乳化調味料に対し80~98%であり、窒素を含泡させた気泡入り水中油型乳化

調味料、(2) 製品に対し卵黄リポ蛋白質が1.5~7.5重量%、pH3.0~5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が0.2~0.8重量%配合された(1)の気泡入り水中油型乳化調味料、(3) 卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質である(1)乃至(2)の気泡入り水中油型乳化調味料、(4) 卵黄リポ蛋白質中における卵黄リゾホスホリポ蛋白質の含有量が全卵黄リポ蛋白質に対し10重量%以上である(3)の気泡入り水中油型乳化調味料、を提供することである。

【0006】 本発明において水中油型乳化調味料とは、水相中に食用油脂が均一に分散して乳化状態が維持された調味料をいい、代表的製品としては例えば、マヨネーズやサラダドレッシング等が挙げられる。このような水中油型調味料は、一般的に食用油脂を20~90重量%含有しており、本発明品の食用油脂含有量も同様である。また本発明に用いる食用油脂は一般的に水中油型調味料として用いられている食用油脂であれば特に限定するものではなく例えば、コーン油、綿実油、サフラワー油、オリーブ油、紅花油、大豆油、ヤシ油、パーム油、魚油等の動植物油及びこれらのサラダ油やMCT(中鎖脂肪酸エステル)等のように化学的処理を施して得られる油脂等が挙げられる。

【0007】 また本発明は気泡がほぼ全体に均一に存在した気泡入り水中油型乳化調味料であるが、気泡の大きさとしてはホイップされた一般的な食品とその気泡の大きさは同程度であり、通常その大きさは数ミクロンから数千ミクロン程度である。また本発明では気泡中の気体は窒素を用いる。後述の試験例に示すように窒素以外のガス例えば、炭酸ガスを用いると、あるいは単に空気を用いると食味において、製造直後は問題ないが、その後、長期間放置していると製造直後の食味が維持されず好ましくない。なお、窒素としては純度がほぼ100容量%のものが望ましいが、約90容量%以上の純度であれば問題ない。

【0008】 本発明において卵黄リポ蛋白質とは、リン脂質、コレステロール、トリグリセリド及び卵黄蛋白質等の成分からなる卵黄の主成分として存在する複合体であるが、本発明ではさらに卵黄リポ蛋白質をリン脂質分解酵素であるホスホリバーゼAで処理しリン脂質の1位あるいは2位のいずれかのエステル結合を分解しリゾリン脂質と脂肪酸の状態で複合体を形成した卵黄リゾホスホリポ蛋白質や、卵黄リポ蛋白質を蛋白分解酵素で処理したもの、加圧あるいは加熱変性したもの等も含まれる。なお、本発明で用いる卵黄リポ蛋白質としては、通常乳化食品の原料として用いられている卵黄液をそのまま本発明品に用いてもよく、また上述のような処理を施して得られる液、あるいはこれらの液を噴霧乾燥(スプレードライ)や凍結乾燥(フリーズドライ)等により乾物としたもの、さらにはこの乾物を水戻したもの等を

用いてもよい。

【0009】本発明で用いる卵黄リポ蛋白質としては、卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質であることが好ましく、さらに卵黄リポ蛋白質中ににおける卵黄リゾホスホリポ蛋白質が全卵黄リポ蛋白質に対し10重量%以上であることがより好ましい。その理由は、後述の試験例に示すように卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質であるものを用いたほうが長期間放置しても製造直後の軽い食感がより維持され好ましく、さらに卵黄リゾホスホリポ蛋白質の割合が10重量%以上の卵黄リポ蛋白質を用いたほうが製造直後においてより軽い食感が得られ、また長期間放置しても製造直後のより軽い食感を維持できるからである。

【0010】また卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質であるものを得るには、例えば、卵黄液にホスホリパーゼAを作用させて所望するところでその反応を終了させる方法、あるいは全卵黄リポ蛋白質をホスホリパーゼAで卵黄リゾホスホリポ蛋白質とした卵黄液と未処理の卵黄液とを任意の割合で混合するあるいは別々に製品に配合する方法等がある。

【0011】本発明においてpH3.0～5.0の範囲で酸変性を起こす卵黄リポ蛋白質以外の蛋白質とは例えば、卵白蛋白質、カゼイン及びその塩、大豆蛋白質、小麦蛋白質等のように酸変性を起こしやすいものをいい、気泡しやすく泡が安定な卵白蛋白質が望ましい。後述の試験例に示すようにpH3.0～5.0で酸変性を起こしにくいと言われている乳清蛋白質のみでは製造直後軽い食感を有し問題ないものの、その後、長期間放置することで製造直後の軽い食感を維持できないため好ましくない。

【0012】本発明では、上述の卵黄リポ蛋白質とpH3.0～5.0の範囲で酸変性を起こす卵黄リポ蛋白質以外の蛋白質とを製品に対しそれぞれ1.5～7.5重量%及び0.2～0.8重量%配合させることが後述の試験例に示すように長期間放置しても製造直後の軽い食感をより維持できることから好ましい。

【0013】本発明の気泡入り水中油型乳化調味料は、全体の粘度が10万mPa・s以上である。これよりも粘度が低いと後述の試験例に示すように製造直後の軽い食感を長期間維持することが出来ず好ましくない。なお、全体の粘度を100万mPa・s以下としたのは、それより大きくて製造直後の軽い食感は維持できるものの粘度が高すぎて水中油型乳化調味料として好ましくないからである。また本発明の粘度は、200ml容量のビーカーに200ml程度本発明の気泡入り水中油型乳化調味料を充填後、HELI PATH STAND付B型粘度計〔(株)東京計器製〕でT-BAR SPI NGLE Dのローターを用い、品温約20°C、回転数2r.p.mで1分後の粘度である。

【0014】本発明品はpHが5.0以下である。これよりもpHが高いと後述の試験例に示すように製造直後の軽い食感を長期間維持することが出来ず好ましくない。なお、pHを3.0以上としたのは、それより小さくても目的とするものは出来る場合があるものの食味がすっぽり水溶型乳化調味料として好ましくないからである。本発明でpHを5.0以下とする方法としては特に限定するものではないが、例えば、酢酸、乳酸、リンゴ酸、クエン酸、マレイン酸、フマル酸、コハク酸、アジピン酸等の有機酸あるいはこれらを主成分とした例えば、食酢、醸酢乳酸、リンゴ酢、レモン水等の酸材を用いると良い。

【0015】また本発明品は比重が脱気された水中油型乳化調味料に対し80～98%、好ましくは85～96%である。後述の試験例に示すように98%より少ないと含泡させたとしても製造直後の食感が軽くないため好ましくなく、また80%より多いと製造直後の軽い食感を長期間維持できないため好ましくない。なお、本発明における脱気品に対する比重の割合は、3L(リットル)測定用のメスシリンダーを用い、品温約20°Cのときの比重により算出した割合である。

【0016】本発明の気泡入り水中油型乳化調味料には、上述の食品原料以外に本発明の効果を損なわない範囲で各種食品原料を適宜選択し配合することができる。例えば、グルタミン酸ナトリウム、砂糖、食塩、味噌、醤油、諸味、豆板醤等の各種調味料、動植物のエキス類、キサンタンガム、ローカストビーンガム、ジェランガム、タマリンド種子ガム、生澱粉、化工澱粉等の増粘剤、からし粉等の香辛料、各種具材やペースト状物等が挙げられる。

【0017】本発明の気泡入り水中油型乳化調味料は、卵黄リポ蛋白質、及びpH3.0～5.0の範囲で酸変性を起こす前記卵黄リポ蛋白質以外の蛋白質が配合させ、全体の粘度が10万～100万mPa・s、pHが3.0～5.0、比重が脱気された水中油型乳化調味料に対し80～98%とし、窒素を含泡させることにより、はじめて製造直後の軽い食感、さらには食味が長期間維持された好ましい乳化調味料となる。

【0018】次に、本発明を実施例及び試験例に基づき、さらに詳細に説明する。なお、本発明はこれらに限定されるものではない。

【0019】

【実施例】 [実施例1] 卵黄リポ蛋白質の約30重量%が卵黄リゾホスホリポ蛋白質である卵黄液10kg、清水7.0kg、生卵白4.5kg、食酢(酸度13重量%)4.5kg、食塩1.8kg、上白糖1.7kg及びからし粉0.5kgを順次ミキサー内に投入しながら、窒素(純度99重量%以上)を溶液内に噴入すると共に攪拌して、含泡させると共に均一とした。その後、窒素の噴入は続けながらサラダ油70kgを徐々に添加

し、含泡させながら粗乳化させた。次にこの気泡入りの粗乳化物を直ちにコロイドミルに通し仕上げ乳化を施した後、300ml容量のチューブに充填・密封した。

【0020】得られた気泡入り水中油型乳化調味料は、窒素を噴入せずに製造したものに比べ軽い食感を有し、また室温保存2ヶ月後も製造直後の軽い食感、さらには食味を維持していた。なお、製品中の卵黄リポ蛋白質（その内30重量%は卵黄リゾホスホリポ蛋白質）は5重量%であり、卵白蛋白質は0.45重量%である。また全体の粘度は約25万mPa·s、pHは4.0であり、比重は脱気しながら製造したものに対し9.2%であった。

【0021】【実施例2】清水に化工澱粉（アルファ一化化工澱粉：Oji-National COMPANY, LTD. 製、商品名「イソタントクリアージュ」）3.0kg、キサンタンガム0.2kg及びタマリンド種子ガム0.1kgを溶解させた水溶液28.7kg、卵黄リポ蛋白質の約30重量%が卵黄リゾホスホリポ蛋白質である卵黄液10kg、生卵白7.0kg、食酢（酸度13重量%）6.1kg、上白糖4.7kg、食塩3.0kg及びグルタミン酸ナトリウム0.5kgを順次ミキサー内に投入しながら、窒素（純度99容量%以上）を溶液内に噴入すると共に攪拌して、含泡させると共に均一とした。その後、窒素の噴入は続けながらサラダ油40kgを徐々に添加し、含泡させながら粗乳化させた。次にこの気泡入りの粗乳化物を直ちにコロイドミルに通し仕上げ乳化を施した後、300ml容量のチューブに充填・密封した。

【0022】得られた気泡入り水中油型乳化調味料は、窒素を噴入せずに製造したものに比べ軽い食感を有し、また室温保存2ヶ月後も調整直後の軽い食感、さらには食味を維持していた。なお、製品中の卵黄リポ蛋白質（その内30重量%は卵黄リゾホスホリポ蛋白質）は5重量%であり、卵白蛋白質は0.7重量%である。また全体の粘度は約24万mPa·s、pHは4.1であり、比重は脱気しながら製造したものに対し9.1%であった。

#### 【0023】

【試験例】【試験例1】含泡させる気体の種類による食味の経時的变化を調べるため、実施例1において窒素に換えて炭酸ガスを用いたもの（比較品No.1）と空気を用いたものを（比較品No.2）製造し、これと実施例1で得られたもの（発明品No.1）とを比較した。なお、試験は室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。

#### 【0024】

【表1】

	気体の種類	食味の変化
発明品No.1	窒素	殆ど変化なし
比較品No.1	炭酸ガス	酸味が増している
比較品No.2	空気	油脂がやや変敗している

【0025】表1より、含泡させる気体の種類として窒素を用いなければ長期間放置した場合、製造直後の食味を維持できないことが理解される。なお、各気体を噴入せず脱気しながら製造したものと比較し各気体を噴入した製造直後品は軽い食感を有し、また室温保存2ヶ月後も調整直後の軽い食感を維持していた。

【0026】【試験例2】卵黄リポ蛋白質を用いた場合とそうでない場合との食感の経時的变化を調べるため、実施例1において実施例1で用いた卵黄リポ蛋白質の代わりにこの卵黄リポ蛋白質中に存在するほぼ同量の卵黄リン脂質【キューピー（株）製、商品名「卵黄レシチンPL-100H」】及び卵黄リゾリン脂質【キューピー（株）製、商品名「卵黄レシチンLC-100」】を用い、不足分は清水を加配したもの（比較品No.3）を製造し、これと実施例1で得られたもの（発明品No.1）とを比較した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。

#### 【0027】

【表2】

	卵黄リポ蛋白質の配合の有無	食感の経時的变化
発明品No.1	配合している	◎
比較品No.3	配合していない	×

#### 【0028】註1）表中の記号

◎：保存後も保存前の軽い食感あるいはやや軽い食感を維持しているもの

○：保存前の軽い食感あるいはやや軽い食感が保存後若干変化しているものの問題のない程度であるもの

△：保存前は軽い食感であるが、保存後やや軽い食感と変化したもの

×：保存前あるいは保存後において陰性対照と同程度の食感を有するもの

【0029】表2より、卵黄リポ蛋白質を配合しなければ長期間放置した場合、製造直後の軽い食感を維持できないことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0030】【試験例3】pH3.0～5.0の範囲で酸変性を起こす卵黄リポ蛋白質以外の蛋白質を用いた場合とそうでない場合との食感の経時的变化を調べるため、実施例1において実施例1で用いた生卵白の代わりにこの生卵白中の卵白蛋白質とほぼ同量の乳清蛋白質を用い、不足分は清水を加配したもの（比較品No.4）を製造し、これと実施例1で得られたもの（発明品No.1）とを比較した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

【0031】

【表3】

	酸変性蛋白質の配合の有無	食感の経時的变化
発明品No. 1	配合している	◎
比較品No. 4	配合していない	×

【0032】表3より、酸変性蛋白質を配合しなければ長期間放置した場合、製造直後の軽い食感を維持できないことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0033】【試験例4】仕上がりの粘度による食感の経時的变化を調べるため、実施例1において製造の際使用したコロイドミルの回転数やクリアランスを変えて表4に示す粘度としたもの（比較品No. 5、発明品No. 2～5）、また高粘度のものはさらに化工澱粉（商品名「インスタントクリアージェル」）を粗乳化段階で添加し表4に示す粘度としたもの（発明品No. 6～7、比較品No. 6）をそれぞれ製造し評価した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

【0034】

【表4】

	仕上がり粘度(mPa·s)	食感の経時的变化
比較品No. 5	7万	×
発明品No. 2	10万	○
発明品No. 3	15万	◎
発明品No. 4	21万	○
発明品No. 5	48万	○
発明品No. 6	76万	○
発明品No. 7	100万	○
比較品No. 6	121万	○

【0035】表4より、仕上がりの粘度を10万mPa·s以上としなければ長期間放置した場合、製造直後の軽い食感を維持できないことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていたが、比較品No. 6は粘度が高すぎて水中油型乳化調味料としては好ましくなかった。

【0036】【試験例5】仕上がりのpHによる食感の経時的变化を調べるため、実施例1において食酢の添加量を変えて表5に示すpHとしたものをそれぞれ製造し評価した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

【0037】

【表5】

	仕上がりpH	食感の経時的变化
比較品No. 7	5.5	△
発明品No. 8	5.0	○
発明品No. 9	4.6	◎
発明品No. 10	3.8	○
発明品No. 11	3.0	○
比較品No. 8	2.7	○

【0038】表5より、仕上がりのpHを5.0以下としなければ長期間放置した場合、製造直後の軽い食感を維持できないことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていたが、比較品No. 8は食味がすっぱすぎて好ましくなかった。

【0039】【試験例6】比重の違いによる食感の経時的变化を調べるため、実施例1において粗乳化段階でのミキサーの回転数や攪拌時間を変えて表6に示す（窒素を噴入せず脱気しながら製造したものに対する比重の割合）ものをそれぞれ製造し評価した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

【0040】

【表6】

	脱気品に対する比重の割合	食感の経時的变化
比較品No. 9	99%	×
発明品No. 12	98%	○
発明品No. 13	96%	◎
発明品No. 14	92%	○
発明品No. 15	85%	○
発明品No. 16	80%	○
比較品No. 10	75%	△

【0041】表6より、脱気品に対する比重の割合が80～98%の範囲としなければ長期間放置した場合、製造直後の軽い食感を維持できること、特に85～96%が製造直後の軽い食感の維持としては好ましいことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0042】【試験例7】卵黄リポ蛋白質の配合量による食感の経時的变化を調べるため、実施例1において卵黄液の配合量を変えて（過不足分は清水で調整）表7に示す卵黄リポ蛋白質の配合量のものをそれぞれ製造し評価した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

【0043】

【表7】

	卵黄リポ蛋白質の配合量	食感の経時的变化
発明品No. 17	1. 0 %	○
発明品No. 18	1. 5 %	◎
発明品No. 19	4. 0 %	◎
発明品No. 20	6. 0 %	◎
発明品No. 21	7. 5 %	◎
発明品No. 22	8. 0 %	○

【0044】表7より、卵黄リポ蛋白質の配合量を1.5~7.5重量%の範囲としたものが長期間放置しても製造直後の軽い食感をより維持することができ好ましいことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0045】[試験例8] pH 3.0~5.0の範囲で酸変性を起こす卵黄リポ蛋白質以外の蛋白質の配合量による食感の経時的变化を調べるため、実施例1において生卵白の配合量を変えて(過不足分は清水で調整)表8に示す卵白蛋白質の配合量のものをそれぞれ製造し評価した。なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したものを陰性対照とした。表中の記号は試験例2と同じである。

#### 【0046】

【表8】

	卵白蛋白質の配合量	食感の経時的变化
発明品No. 23	0. 15 %	○
発明品No. 24	0. 2 %	◎
発明品No. 25	0. 5 %	◎
発明品No. 26	0. 8 %	◎
発明品No. 27	0. 9 %	○

【0047】表8より、蛋白質の配合量を0.2~0.8重量%の範囲としたものが長期間放置しても製造直後の軽い食感をより維持することができ好ましいことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0048】[試験例9] 卵黄リポ蛋白質中における卵黄リゾホスホリポ蛋白質の割合による食感の経時的变化を調べるため、実施例1においてホスホリパーゼAの処理条件を変えて表9に示す卵黄リゾホスホリポ蛋白質の割合の卵黄液を用いたものをそれぞれ製造し評価した。

なお、試験は試験例1と同様に室温で2ヶ月間保存し、これと新たに製造したものを製造直後品として両者を試食し評価した。また窒素を噴入せず脱気しながら製造したもの陰性対照とした。

#### 【0049】

【表9】

	リゾ蛋白質中のリゾホスホリポ蛋白質の割合	食感の経時的变化
発明品No. 28	0 %	○-2
発明品No. 29	5 %	◎-2
発明品No. 30	10 %	◎-1
発明品No. 31	40 %	◎-1
発明品No. 32	80 %	◎-1
発明品No. 33	100 %	◎-1

#### 【0050】註2) 表中の記号

○-1：保存後も保存前の軽い食感を維持しているもの

○-2：保存後も保存前のやや軽い食感を維持しているもの

○-1：保存前の軽い食感が保存後若干変化しているものの問題のない程度であるもの

○-2：保存前のやや軽い食感が保存後若干変化しているものの問題のない程度であるもの

△：保存前は軽い食感であるが、保存後やや軽い食感と変化したもの

×：保存前あるいは保存後において陰性対照と同程度の食感を有するもの

【0051】表9より、卵黄リポ蛋白質の一部又は全部が卵黄リゾホスホリポ蛋白質であるものを用いたほうが長期間放置しても製造直後の軽い食感を維持することができることから好ましく、さらに卵黄リゾホスホリポ蛋白質の割合が10重量%以上の卵黄リポ蛋白質を用いたほうが製造直後においてより軽い食感が得られ、また長期間放置しても製造直後のより軽い食感を維持することができることからより好ましいことが理解される。なお、いずれの保存品とも製造直後の食味は維持されていた。

【0052】以上述べたように、本発明の気泡入り水中油型乳化調味料は、製造直後の軽い食感、さらには食味が長期間維持されたものであるから、水中油型乳化調味料の更なる需要の拡大が期待される。